

38. The process of Claim 22 wherein the predetermined time range in step (3) is from 1 minute to 100 minutes.

39. The process of Claim 22 wherein the predetermined time range in step (3) is from 1 minute to 1 hour.--

REMARKS

The specification has been amended to correct minor clerical errors. No new matter has been entered. Pursuant to 37 CFR §1.121 a copy of the amended specification paragraphs showing the changes made therein accompanies this Amendment.

The claims have been rewritten to address the §112 rejections, and also to better define the claimed invention and distinguish the claimed invention from the prior art.

Considering first the election requirement, Applicants confirm the election of Group II.

The provisional double-patenting rejection is noted. Applicants will file a Terminal Disclaimer, if necessary, once the claims are allowed.

Turning to the several art rejections, the present invention provides cost/performance advantages not achievable by the prior art. More particularly, the present invention produces novel alloys having cost performance and excellently high hydrogen storage capacity per unit weight, i.e., advantageous hydrogen absorbing and desorbing properties. Moreover, the present inventors have succeeded in providing such advantageous performance properties while reducing the requirement for expensive elements V, Mo and W.

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The prior art failed to reduce the requirement of expensive metals (i.e., V, Mo and W) because heretofore the reduction of V, Mo and W levels always led to a significant loss of hydrogen storage capacity per unit weight in prior art.

The present invention employs a unique process for producing alloys by:

- (a) providing a unique starting material;
- (b) forming a heated homogeneous alloy;
- (c) maintaining the heated homogeneous alloy at a temperature within a range just below the melting point of the alloy for a predetermined time; and
- (d) rapidly-quenching in iced water.

Unlike the prior art, where the upper heating temperature limit generally is 1300°C, Applicants preferably employ a temperature of 1400°C or higher (claims 34 and 35) for from 1 minute to 1.9 hours (114 minutes) (claims 37 and 38). None of the applied references teaches or suggests providing a starting mixture having a composition formula as required by independent claim 22. Thus, no combination of the applied art could achieve or render obvious independent claim 22 or any of the claims dependent thereon, or the advantages thereof as discussed at length in Applicants' specification.

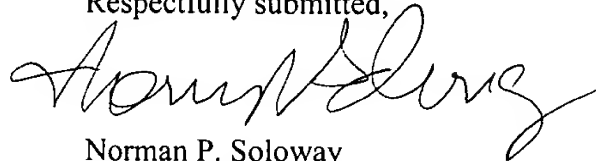
Having dealt with all the objections raised by the Examiner, the Application is believed to be in order for allowance. Early and favorable action are respectfully requested.

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In the event there are any fee deficiencies or additional fees are payable, please charge them (or credit any overpayment) to our Deposit Account No. 08-1391.

Respectfully submitted,



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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on April 30, 2003 at Tucson, Arizona.

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MARKED SPECIFICATION PARAGRAPHS

Paragraph bridging pages 7 and 8, beginning at page 7, line 24:

Such characteristics lead to the following: part of the content of precious V can be replaced with at least one member selected from Mo and W which are each [potently] potentially capable of forming a BCC structure together with Ti and Cr in the same manner as V, thereby enabling not only the cost to be relatively low but also a decrease in hydrogen storage capacity per unit weight, brought about by the incorporation of Mo or W, to be limited to a relatively minor one, with the result that the hydrogen storage metal alloys can be produced which come to an excellent balance between the cost and the hydrogen storage capacity per unit weight and become advantageously practicable, provided that other elements can be optionally admixed as long as their admixture does not affect greatly the aforementioned properties of the hydrogen storage metal alloys.

Paragraph beginning at page 10, line 14:

It is preferred that the element ratios are those described in any of the Claims [1 to 8] regarding the aforementioned hydrogen storage metal alloy products obtained by the hydrogen storage metal alloy-producing process according to the present invention.

Paragraph beginning at page 10, line 19:

As a result thereof, alloys wherein the main phase is a BCC-type structure can be produced in a stable fashion from each alloy having a highly practicable composition according to any of the Claims [1 to 8].

Paragraph bridging pages 12 and 13, beginning at page 12, line 33:

Further, although element V has an atomic weight approximately equivalent to that of Ti or Cr and is precious, even a large quantity of its substituent leads to a less increase in molecular

weight for alloy products whereby there is [an] a practicable [values] value, i.e., at the Cr level of 20 to 80 at%.

Paragraph beginning at page 19, line 3:

In the Examples, alloys per se were subjected to the aforementioned heat treatment after melting ingots without making any shapes. Since such a process does not require that cooled alloys are re-heated but enables us to produce efficiently alloy products having a BCC structure phase, it is preferable but the present invention is not so limited [to]. For example, it may be preferred that molten alloys are shaped once by methods such as strip casting, mono roll casting and atomizing methods to [afford] produce plates, ribbons or powders, then cooled and the resultant alloys each having either the BCC phase + the Laves phase or the Laves phase alone are subjected to the aforementioned heat treatment so as to form the BCC structure phase as the main phase.

Paragraph bridging pages 23 and 24, beginning at page 23, line 35:

Although each of Mo and W is admixed alone in order to clarify the efficacy of individual admixed elements in the foregoing embodiments, the present invention is not so limited [to]. It is preferred that one of two elements Mo and W may be admixed therewith in combination with the other. For amounts of the admixed elements in this instance, it is preferable that a total amount of admixed elements Mo and W may be less than 5 at %.